Math 252 Lab #4 Winter 2013 Name(s)______________________________________

This lab is an effort to give you more practice on finding the volumes of rotations as well as some practice with numerical integration on your calculator. This lab will be due Monday, of week 7. You will be graded on getting the integrals set up correctly, using proper notation, as well as neatness and accuracy. You are allowed to hand-in one paper with as many as four names on it. Show any work on a separate paper stapled to this one, in pencil please.

1. Consider the region bounded by the curves $y = \sqrt{x}$, $y = 0$, and the line $x = 4$. Draw a sketch of the graphs with the region lightly shaded in.

a) Rotate this region about the y-axis and find its volume two different ways. That is, use the disk/washer method and then the shell method. Write the integrals you derived here, along with their results. Show necessary work, finding the antiderivatives on your other paper for problems 1 and 2.

b) Rotate the same region about the x-axis and again find its volume two different ways. Again, write the integrals you derived here, along with their results.

c) Now rotate the region about the line $y = 2$ and find its volume two different ways with the integrals you derived here, along with their results.

2. Consider the region bounded by the curves $y = x^2$ and the line $y = 2x$. Show a sketch of the graphs and the region to be rotated on your paper.

a) Rotate this region about line $x = 2$ and find the volume of the resulting solid. Use either method. Write the integral you derived here, along with its result.

b) Rotate the given region about the y-axis and find the volume of the resulting solid. Use either method. Write the integral you derived here, along with its result.

3. Set up and write the integrals here that will find the volumes using any technique you want. Instead of actually finding the anti-derivative, use the numerical integration feature on your calculator to approximate this integral. Factor out the π and put it with your final answer. For each**, s**how a sketch of the graphs and the region to be rotated on your paper. Note: to numerically integrate f(x) on the interval [a,b] using a TI83-84 select **MATH, 9:fnInt(** . The argument form for **fnInt(** is **fnInt(**f(x),x,a,b**)** where you'll enter the expression that represents f(x).

a) The region is bounded by the curves $y = x^2$, $y = (x - 2)^2$ and $x = 2$ and is rotated about the line $x = 2$.

b) The region is bounded by $y = -x^2 + 4x - 3$ and the x-axis is rotated about the y-axis.

c) The region is bounded by $y = -x^2 + 4x - 3$ and the x-axis and is rotated about the x-axis.